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LEE & HAYES PLLC
421 W RIVERSIDE AVENUE SUITE 500
SPOKANE, WA 99201

EXAMINER	
MICHALSKI, JUSTIN I	
ART UNIT	**PAPER NUMBER**
2644	13

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/637,821	JOHNSON ET AL.
	Examiner	Art Unit
	Justin Michalski	2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 8/11/200 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-54 is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) 1-54 is/are rejected.

7)☐ Claim(s) ~~[illegible]~~ is/are objected to. JM

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ______ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on ______ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

achment(s)

☒ Notice of References Cited (PTO-892)

☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 5 .

4) ☐ Interview Summary (PTO-413) Paper No(s). ______ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 13 is objected to because of the following informalities: On line 10 of Claim 13, "...having a responses that..." is unclear. Appropriate correction is required.

2. Claim 19 is objected to because of the following informalities: On line 2 of Claim 19, "...at least on of cone..." is unclear. Appropriate correction is required.

3. Claim 49 is objected to because of the following informalities: On line 2 of Claim 19, "...at least on of cone..." is unclear. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-3, 5, and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Yashima et al. (US Patent 5,953,431).

Regarding Claim 1, Yashima et al. discloses an apparatus for modifying an electrical audio signal (Fig. 4) for input to a sonic reproduction device (references 4, 200, and 300) characterized by a plurality of individual responses which in combination define an overall response for the sonic reproduction device (references 102, 103, 202, and 104), each individual response comprising at least one of a frequency, time, phase or transient response (Yashima discloses individual responses consist of frequency response) (Column 1, lines 18-21), said apparatus comprising: a plurality of modification filters having modification responses that simulate the plurality of individual responses (references 102, 103, 202, 104, 203, and 2), the modification filters for receiving the electrical audio signal (reference 1), modifying the electrical audio signal and providing the electrical audio signal to the sonic reproduction device (references 4, 200, and 300); and a plurality of adjustable parameters (references 4, 200, and 300 can be changed therefore adjusting parameters), each associated with at least one of the modification filters for allowing adjustments to the responses of the modification filters (references 4, 200, and 300 relate to filters 102, 103, and 202 respectively); wherein the adjustments create a plurality of individual conjugate responses, each individual conjugate response associated with at least one of the plurality of individual responses (Yashima et al.

discloses references 102, 103, and 202 are inverse characteristics of their respective responses) (Column 10, lines 56-66).

Regarding Claim 2, Yashima et al. further discloses the plurality of individual responses of the sonic reproduction device are related to at least one of mechanical, acoustic and electromagnetic behavior of the sonic reproduction device. Yashima et al. discloses that response 201 represents speaker (i.e. electromagnetic), response 103 represents ducted horn (i.e. mechanical and acoustic), and response 202 represents acoustic resistance (i.e. mechanical and acoustic) (Column 10, lines 52-66).

Regarding Claim 3, Yashima et al. further discloses filters defined by digital signal processes (Column 6, lines 28-31).

Regarding Claim 5, Yashima et al. further discloses the plurality of modification filters are non-interacting. Filters are independent and characteristic of their respective component (Column 10, lines 52-66).

Regarding Claim 6, Yashima et al. discloses the plurality of modification responses combine to form an overall response that is a conjugate to the overall response for the sonic reproduction device. Yashima et al. discloses filter 203 which apply the inverse transfer characteristic of the ducted horn (Column 10, line 66 through Column 11, line 1).

6. Claim 29, 30, 32, 37-41, 45, 50, and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by Narasimhan et al. (US Patent 6,252,968).

Regarding Claim 29 Narasimhan et al. discloses a sonic reproduction device having associated mechanical, acoustic and electromagnetic behavioral characteristics (reproduction medium 300); a source for outputting an electrical audio signal to a model of the sonic reproduction device (source 140), the model having a plurality of filters (Narasimhan et al. discloses M number of sub-bands (i.e. filters) (Column 3, lines 23-32)) that simulate at least one of the mechanical, acoustic and electromagnetic behavioral characteristics of the sonic reproduction device, each filter having an associated response comprising at least one of a frequency, time, phase or transient response (filters relate to frequency response of device) (Column 2, lines 41-51), the model outputting the electrical audio signal to the sonic reproduction device (reproduction medium 300); and a controller (Computer 110) that modifies the responses of the filter to transform the model into a conjugate model having a plurality of filters (filters 220) with responses that comprise conjugates to the original response of the filter.

Regarding Claim 30, Narasimhan et al. further discloses the filters are used using sampling methods (i.e. digital signal processes) (Column 3, line 57 through Column 4, line 2).

Regarding Claim 32, Narasimhan et al. further discloses a plurality of filters (220) which are independent corresponding each to their frequency sub-band (Column 3, lines 21-26).

Regarding Claim 37, Narasimhan et al. discloses a method for modifying an electrical audio signal (source 140) for input to a sonic reproduction device (device 300)

characterized by a plurality of individual responses (sub-band filters 220) which in combination define an overall response for the sonic reproduction device, each individual response comprising at least one of a frequency, time, phase, or transient response comprising steps of (filters represent frequency response)(Column 2, lines 41-51): simulating the plurality of individual responses with a plurality of filters (M sub-bands) (Column 3, lines 22-33); adjusting the responses of the plurality of filters such that, for each filter, the adjusted response comprises a response that is a conjugate to one of the individual responses (sub-band inverse filter 220); inputting the electrical audio signal to the filters (output of 140 to 200).

Regarding Claim 38, Narasimhan et al. further discloses the plurality of individual responses of the sonic reproduction device relating to at least one of a mechanical, acoustic, and electromagnetic behavior of the sonic reproduction device. (Narasimhan et al. discloses filters are based on frequency sub-bands, i.e. acoustic behavior) (Column 3, lines 22-33).

Regarding Claim 39, Narasimhan et al. further discloses a plurality of filters (220) which are independent corresponding each to their frequency sub-band (Column 3, lines 21-26).

Regarding Claim 40, Narasimhan et al. further discloses the plurality of adjusted responses combine to form an overall response that is a conjugate to the overall response for the sonic reproduction device. (Figure 3, inverse filters combine at 240 to create overall inverse response)

Regarding Claim 41, Narasimhan et al. further discloses the filters comprise of sub-band filters (i.e. cut off at a certain frequency) which is adjusted by the center frequency (i.e frequency response) (Column 2, lines 41-51).

Regarding Claim 45, Narasimhan et al. further discloses a method of altering an electrical audio signal for input to a sonic reproduction device (device 300) having associated behavioral characteristics, said method comprising the steps of: simulating at least one of the behavioral characteristics of the sonic reproduction device with a plurality of filters (Narasimhan et al. discloses M number of sub-bands (i.e. filters) (Column 3, lines 23-32)), each filter having an associated response comprising at least one of a frequency, time, phase or transient response (filters represent frequency response) (Column 2, lines 41-51); and for each of the filters, modifying the response of the filter to transform the filter into a conjugate filter having a response that comprises a conjugate to the original response of the filter (sub-band inverse filters 220).

Regarding Claim 50, Narasimhan et al. further discloses the sonic reproduction device comprising speakers (speakers 120) and at least one of the plurality of filters (M filters) has at least one associated adjustable parameter (frequency parameters of M filters) and the step of modifying the response of the filter comprising steps of; deriving the at least one adjustable parameter from a standard speaker model (i.e training phase); and setting the parameter to the derived value (inverse filter parameters are adjusted based on training phase) (Column 3, lines 21-47).

Regarding Claim 51, Narasimhan et al. discloses at least one of the plurality of filters (M filters) having at least an associated adjustable parameter (frequency sub-

bands) and the step of modifying the response of the filter comprising steps of: determining the at least one adjustable parameter experimentally using standard test measurements (test phase); and setting the parameter to the determined value (Column 3, lines 21-47).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as applied to claim 1 above in view of Konno (US Patent 5,305,388).

Regarding Claim 4, Yashima et al. discloses an apparatus as stated in Claim 1 above. Yashima et al. does not disclose filters defined by analog circuitry. Konno discloses a compensation circuit for a sound reproduction device containing filters for modifying an audio input (Figure 1). Konno discloses the filters as analog as disclosed in Fig. 1 and being able to be controlled by a variable resistor (Column 2, lines 23-29). It is known in the art that analog filters can be used to modify the response of an audio signal as taught by Konno (Column 1, lines 61-68). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to use analog filters to modify the audio signal to produce a higher fidelity audio output.

Regarding Claim 7, Yashima et al. discloses an apparatus for modifying an electrical audio signal as stated in Claim 1. Yashima et al. does not disclose at least one of the modification filters comprising of a cut-off filter and the parameters for adjusting the frequency response of the cut-off filter by frequency, amplitude, and Q parameters. Konno discloses a sound compensation circuit for use in a sound reproduction device including a high-pass filter (i.e. cut-off filter) whose response can be changed by adjusting its Q value, cutoff frequency (i.e. peak frequency), and volume (i.e. amplitude) (Column 2, lines 23-29). It is known in the art that peak frequency, amplitude, and Q parameters affect the response of filters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to change the frequency response of a modification filter by using parameters such as peak frequency, amplitude, and Q parameters as described by Konno in order to produce a higher fidelity audio signal.

Regarding Claim 8, Konno further discloses the peak frequency, amplitude, and Q parameters modify the frequency response of the cut-off filter in at least one of the how and high frequency ranges. (Konno discloses the filter as a high pass filter (Column 2, lines 23-26), therefore affecting the response in the low frequency range due to the cut-off frequency.)

9. Claim 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as applied to claim 1 above, and further in view of Craven et al. (US Patent 5,815,580).

Regarding Claim 9, Yashima et al. discloses an apparatus for modifying an electrical audio signal as stated in Claim 1. Yashima et al. does not disclose a filter comprising a constant slope equalizer and the parameters for adjusting the frequency response of the constant slope equalizer comprising of crossover frequency and boost shelf parameters. Craven et al. discloses an audio compensating system and an equalizer which can by adjusted to compensate for irregularities based on the response of the electro-acoustic transducer or the acoustic environment in which the transducer is positioned (i.e. response could be based on crossover frequency and boost shelf parameters) (Column 1, lines 43-48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an equalizer with adjustable parameters in order to make compensations to the signal to produce a higher fidelity audio output.

Regarding Claim 10, Craven et al. further discloses the equalizer comprising a plurality of band pass filters each with its own gain control (i.e. gain control could be configured to modify response in high or low frequency ranges) (Column 1, lines 35-39).

10. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as applied to claim 1 above, and further in view of Goff (US Patent 6,319,117). Yashima et al. discloses an apparatus as stated in claim 1. Yashima et al. does not

disclose one of the modification filters comprising of a parametric notch filter and parameters for adjusting the response comprising of notch frequency, amplitude, and Q parameters. Goff discloses a filter for use in an audio device such as parametric equalizers and notch equalizers (i.e. notch filter) (Column 1, lines 15-18). Goff further discloses the response of the filter can be modified by the Q factor, amplitude, and bandwidth (i.e. notch frequency) (Column 1, lines 22-54). It is known in the art that the response of filters can be modified by changing parameters such as Q, amplitude, and frequency as stated by Goff. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a filter whose response is able to be adjusted based on various parameters in order to produce a response resulting in a higher fidelity audio signal.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as applied to claim 1 above, and further in view of Staudacher (US Patent 5,533,120). Yashima et al. discloses an apparatus as stated in claim 1. Yashima et al. does not disclose one of the modification filters comprising a parametric notch-boost filter and the parameters for adjusting the frequency response of the filter comprising notch frequency, amplitude, and Q parameters. Staudacher discloses an equalized amplifying system which contains equalizers (references 18, 29, 22, and 24). The equalizer can be used in such a way that the amount of frequency boost (amplitude) of a particular frequency (i.e. notch) can be adjusted by using equalizers 18, 20, 22, or 24 corresponding to different notch frequencies and Q values (Column 7, line 60 through

Column 8, line 5). It is known in the art that equalizers (i.e. notch-boost filters) can be used to adjust a response of a signal to produce a desired response. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a notch-boost filter to produce a desired response in order to obtain a more high fidelity audio output.

12. Claims 13-16, 18, 19, 21, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. (US Patent 5,953,431) in view of Narasimhan et al. (US Patent 6,252,968).

Regarding Claim 13, Yashima et al. discloses a sound compensation system (Figure 4) for altering an electrical audio signal for input (reference 1) to a sonic reproduction device (references 4, 200, and 300) having associated behavioral characteristics, said system comprising a model of the sonic reproduction device having a plurality of filters (references 102, 103, and 202) that simulate at least one of the behavioral characteristics of the sonic reproduction device (reference 102, 103, and 202 simulate reference 4, 20, and 300 respectively of the sonic reproduction device) (column 10 , lines 52-66), each filter having an associated response that combine to define an overall response for the model, each response comprising at least one of a frequency, time, phase or transient response (Yashima et al. discloses responses being frequency response) (Column 1, lines 18-21). Yashima et al. does not disclose a controller that modifies the response of the filters. Narasimhan et al. discloses a controller (Computer 110) that modifies the response of each of the plurality of filters to

transform the filter into a conjugate filter (filters 220) having a response that is a conjugate to the original response of the filter (Column 3, lines 21-48). Both Yashima et al. and Narasimhan et al. rely on a method of applying a set of inverse filters based on characteristics of a sonic reproduction device. Yashima et al. discloses providing an acoustic replay device with which the sound radiated by the opening of the ducted horn acting as the sound source has a characteristic which is not inferior to the characteristic of the speaker itself (Column 4, lines 56-61). Narasimhan et al. discloses the advantage of inverse filtering to better match the audio signal to the intended audio output (Column 2, lines 48-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of inverse feedback as taught by Narasimhan et al. and Yashima et al. with the method of modeling the individual components in order to obtain a higher fidelity audio output from a sonic reproduction device by accounting for the characteristics of the speaker and physical components of the sound source and sonic reproduction device.

Regarding Claim 14, Yashima et al. further discloses behavioral characteristics defined by individual components of the sonic reproduction device. Yashima et al. discloses sound compensation system (Figure 4) where inverse transfer functions (i.e. behavioral characteristics) 102, 103, and 202 correspond to components 4, 200, and 300 respectively of a sonic reproduction device (Column 10, lines 52-66).

Regarding Claim 15, Yashima et al. further discloses the behavioral characteristics defined by groups of individual components of the sonic reproduction

device (characteristics of reference 203 is defined by ducted horn and acoustic resistance) (Column 10, line 66 through Column 11, line 1).

Regarding Claim 16, Yashima et al. further discloses the filters defined by digital signal processes (digital filter 2). Narasimhan et al. discloses a computer 110 which comprises of filtering unit 200.

Regarding Claim 18, Yashima et al. further discloses the sonic reproduction device comprising of a speaker (references 4, 200, and 300) and at least one of the plurality of filters comprising of at least one associated adjustable parameter (Figures 6 and 7 illustrate types of acoustic resistances which can be changed therefore adjusting the parameter of filter 202) and the value of the parameter is calculated based on physical characteristics of the speaker (filters 102, 103, and 202 are based on references 4, 200, and 300 respectively of the speaker) (Column 10, lines 52-66).

Regarding Claim 19, Yashima et al. further discloses the physical characteristics of the speaker comprising at least one of cone and coil mass, air volume, mechanical compliance, radiating area, damping, moving mass and motor characteristics. Yashima et al. discloses Figures 6 and 7 which represent the acoustic resistance (i.e. damping) of the sonic reproduction device (Column 11, lines 5-18).

Regarding Claim 21, Narasimhan et al. further discloses at least one of the plurality of filters (Filters 200) having at least one associated adjustable parameter (Narasimhan et al. discloses M number of frequencies are collected (i.e. parameters can be adjusted) (Column 3, lines 23-33) and the value of the parameter is determines

experimentally using standard test measurements (Narasimhan et al. discloses tones are transmitted then recorded (i.e. test measurements)) (Column 2, lines 32-38).

Regarding Claim 24, Narasimhan et al. further discloses a system wherein the controller monitors the program conditions at the sonic reproduction device and sets at least one of the parameter values based on the program conditions (Narasimhan et al. discloses monitoring frequency tones (i.e. monitors program conditions) and using the values to adjust inverse filters (i.e. set at least one parameter)) (Column 1, lines 32-51).

Regarding Claim 25, it is known in the art that a speaker system will consist of a way to control volume. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a way of volume control with the system.

13. Claims 17, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as modified as applied to claim 13 above, and further in view of Konno (US Patent 5,305,388).

Regarding Claim 17, Yashima et al. as modified discloses a system as stated in Claim 13 above. Yashima et al. as modified does not disclose filters defined by analog circuits and the controller comprising adjustable circuit components. Konno discloses a compensation circuit for use in sound reproduction devices including analog modification filters (Figure 1). Konno further discloses that the response of the filters can be controlled by a variable resistor (i.e. adjustable circuit components) (Column 2, lines 23-29). It is known in the art that analog filters can be used and controlled to

modify audio signals as taught by Konno. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use analog filters and adjustable circuit components for controlling to produce a response that creates a higher fidelity audio output.

Regarding Claim 22, Yashima et al. as modified discloses a system as stated in claim 13 above. Yashima et al. does not disclose adjusting the setting of one parameter modulates the setting of at least one other parameter. Konno discloses a compensation circuit for use in a sound reproduction device. Konno discloses a compensating filter where the parameters of Q value and cutoff frequency are changed due to a change in the parameter of sound amplitude (Column 2, lines 23-29). Konno teaches the device compensates the frequency response to change the sound volume in natural way. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow one parameter to adjust the setting of another parameter to compensate for an audio signal allowing the output to change in a higher fidelity and natural way as taught by Konno.

Regarding Claim 23, Yashima et al. further discloses a speaker (speaker 4). Konno further discloses when the parameter of volume amplitude is changed the parameters of Q value and cut-off frequency are changed as a result (Column 2, lines 23-29). Since the volume amplitude, Q value, and cut-off frequency effect the audio signal input to the speaker (which consists of a magnetic structure and voice coil) the parameter that modulates at least one other parameter related to the magnet structure and voice coil of the speaker.

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as modified as applied to claim 13 above, and further in view of Craven et al. (US Patent 5,815,580). Yashima et al. as modified discloses a system as stated in claim 13 above. Yashima et al. does not disclose an adjustable parameter derived from a standard speaker model. Craven et al. discloses an audio compensation system (Fig. 3) whose coefficients (i.e. parameters) are based on the model of the speaker) (Column 8, lines 1-11). Craven et al. teaches the coefficients of the filter will compensate for the physical natures of the loudspeaker (Column 8, lines 7-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use parameters based on a standard speaker model in order to create a speaker that compensates for the physical natures of a loudspeaker resulting in a higher fidelity audio signal.

15. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yashima et al. as modified as applied to claim 13 above, and further in view of Staudacher (US Patent 5,533,120).

Regarding Claim 26, Yashima et al. as modified discloses a system as stated in claim 13. Yashima et al. as modified does not disclose one of the filters comprising of a weighted compensation notch filter. Staudacher discloses an equalized amplifying system consisting of an equalizer (references 18, 29, 22, and 24). The equalizer can be used in such a way that the amount of attenuation of a particular frequency (i.e. notch)

can be adjusted (i.e. weighted) by using equalizer 18, 20, 22, or 24. It is known in the art that equalizers or weighted notch filters can be used to adjust a response of a signal to produce a desired response. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a weighted notch filter to produce a desired response in order to obtain a more high fidelity audio output.

Regarding Claim 27, Staudacher further discloses equalizer (references 18, 20, 22, and 24) where if only one band is adjusted (i.e weighted) the effect will be a single-tuned weighted notch filter.

Regarding Claim 28, Staudacher further discloses equalizer (references 18, 20, 22, and 24) where if only two bands are adjusted (i.e weighted) the effect will be a double-tuned weighted notch filter.

16. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 29 above in view of Konno (US Patent 5,305,388). Narasimhan et al. discloses a system as stated in claim 29 above. Narasimhan et al. does not disclose filters defined by analog circuitry. Konno discloses the filters as analog as disclosed in Fig. 1 and being able to be controlled by a variable resistor (Column 2, lines 23-29). It is known in the art that analog filters can be used to modify the response of an audio signal as taught by Konno (Column 1, lines 61-68). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use analog filters to modify the audio signal to produce a higher fidelity audio output.

17. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 29 above in view of Craven et al. (US Patent 5,815,580). Narasimhan et al. discloses a system as stated in claim 29. Narasimhan et al. does not disclose at least one of the filters comprising a constant slope equalizer and modifications to the frequency response of the constant slope equalizer comprising of adjustments to the cross over frequency and boost shelf. Craven et al. discloses an audio compensating system and an equalizer which can by adjusted to compensate for irregularities based on the response of the electro-acoustic transducer or the acoustic environment in which the transducer is positioned (i.e. response could be based on crossover frequency and boost shelf parameters) (Column 1, lines 43-48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an equalizer with adjustable parameters in order to make compensations to the signal to produce a higher fidelity audio output.

18. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 29 above in view of Staudacher (US Patent 5,533,120). Narasimhan et al. discloses a system as stated in claim 29. Narasimhan does not disclose at least one of the filters comprising a parametric notch-boost filter and modifications to the frequency response of the parametric notch-boost filter comprising adjustments to notch frequency, amplitude, and Q. Staudacher discloses an equalized amplifying system which contains equalizers (references 18, 29, 22, and 24).

The equalizer can be used in such a way that the amount of frequency boost (amplitude) of a particular frequency (i.e. notch) can be adjusted by using equalizers 18, 20, 22, or 24 corresponding to different notch frequencies and Q values (Column 7, line 60 through Column 8, line 5). It is known in the art that equalizers (i.e. notch-boost filters) can be used to adjust a response of a signal to produce a desired response. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a notch-boost filter to produce a desired response in order to obtain a more high fidelity audio output.

19. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 29 above, and further in view of Konno (US Patent 5,305,388). Narasimhan et al. discloses a system as stated in claim 29. Narasimhan et al. does not disclose at least one of the filters comprising a cut-off filter and modifications to the frequency response of the cut-off filter comprising adjustments to peak frequency, amplitude, and Q. Konno discloses a sound compensation circuit for use in a sound reproduction device including a high-pass filter (i.e. cut-off filter) whose response can be modified by adjusting its Q value, cutoff frequency (i.e. peak frequency), and volume (i.e. amplitude) (Column 2, lines 23-29). It is known in the art that peak frequency, amplitude, and Q parameters affect the frequency response of filters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to change the frequency response of a filter by using

parameters such as peak frequency, amplitude, and Q parameters as described by Konno in order to produce a higher fidelity audio signal.

20. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 29 above in view of Goff (US Patent 6,317,117). Narasimhan et al. discloses a system as stated in Claim 29. Narasimhan et al. does not disclose at least one of the filters comprising a parametric notch filter and modifications to the frequency response of the filter comprising of adjustments to the notch frequency, amplitude, and Q. Goff discloses a filter for use in an audio device such as parametric equalizers and notch equalizers (i.e. notch filter) (Column 1, lines 15-18). Goff further discloses the response of the filter can be modified by the Q factor, amplitude, and bandwidth (i.e. notch frequency) (Column 1, lines 22-54). It is known in the art that the response of filters can be modified by changing parameters such as Q, amplitude, and frequency as stated by Goff. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a filter whose response is able to be adjusted based on various parameters in order to produce a response resulting in a higher fidelity audio signal.

21. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 37 above, and further in view of Craven et al. (US Patent 5,815,580). Narasimhan et al. discloses a method as stated in claim 37. Narasimhan et al. does not disclose at least one of the filters comprising a constant

slope equalizer and the step of adjusting the frequency response of the constant slope equalizer comprising the step of setting at least one of crossover frequency and boost shelf. Craven et al. discloses an audio compensating system and an equalizer which can by adjusted to compensate for irregularities based on the response of the electro-acoustic transducer or the acoustic environment in which the transducer is positioned (i.e. response could be based on crossover frequency and boost shelf parameters) (Column 1, lines 43-48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an equalizer with adjustable parameters in order to make compensations to the signal to produce a higher fidelity audio output.

22. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 37 above, and further in view of Goff (US Patent 6,317,117). Narasimhan et al. discloses a method as stated in claim 37. Narasimhan et al. does not disclose at least one of the filters comprising a parametric notch filter and the step of adjusting the frequency response of the filter comprising the step of setting at least one of notch frequency, amplitude, and Q. Goff discloses a filter for use in an audio device such as parametric equalizers and notch equalizers (i.e. notch filter) (Column 1, lines 15-18). Goff further discloses the response of the filter can be modified by the Q factor, amplitude, and bandwidth (i.e. notch frequency) (Column 1, lines 22-54). It is known in the art that the response of filters can be modified by changing parameters such as Q, amplitude, and frequency as stated by Goff.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a step for adjusting a filter by adjusting various parameters in order to produce a response resulting in a higher fidelity audio signal.

23. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 37 above in view of Staudacher (US Patent 5,533,120). Narasimhan et al. discloses a method as stated in claim 37. Narasimhan et al. does not disclose at least one of the filters comprising a parametric notch-boost filter and the step of adjusting the frequency response of the parametric notch-boost filter comprising of setting at least one of notch frequency, amplitude, and Q. Staudacher discloses an equalized amplifying system which contains equalizers (references 18, 29, 22, and 24). The equalizer can be used in such a way that the amount of frequency boost (amplitude) of a particular frequency (i.e. notch) can be adjusted by using equalizers 18, 20, 22, or 24 corresponding to different notch frequencies and Q values (Column 7, line 60 through Column 8, line 5). It is known in the art that equalizers (i.e. notch-boost filters) can be used to adjust a response of a signal to produce a desired response. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a step of adjusting a notch-boost filter to produce a desired response in order to obtain a more high fidelity audio output.

24. Claim 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 45 above in view of Yashima et al. (US Patent 5,953,431).

Regarding Claim 46, Narasimhan et al. discloses a method as stated in Claim 45. Narasimhan et al. does not disclose the behavioral characteristics defined by individual components of the sonic reproduction device. Yashima et al. discloses a method of altering an audio signal by using inverse transfer characteristics of a sonic reproduction device. Yashima et al. discloses figure 4 where the behavioral characteristics 102, 103, and 202 correspond to components 4, 200, and 300 respectively on the sonic reproduction device. Yashima et al. teaches that modeling the individual components and applying the inverse function allows sound to be radiated by the device which is not inferior to the speaker itself (Column 4, lines 56-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method of inverse feedback as taught by Narasimhan et al. and apply the method of modeling the individual components as taught by Yashima et al. in order to obtain a higher fidelity audio output from a sonic reproduction device by accounting for the frequency characteristics and component characteristics of the sonic reproduction device.

Regarding Claim 47, Yashima et al. further discloses the behavioral characteristics defined by groups of individual components of the sonic reproduction device (characteristics of reference 203 is defined by ducted horn and acoustic resistance) (Column 10, line 66 through Column 11, line 1).

25. Claims 48, 49, 53, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 45 above in view of Craven et al. (US Patent 5,815,580).

Regarding Claim 48, Narasimhan et al. discloses a method as stated in claim 45 above and speakers 120. Narasimhan et al. does not disclose steps of calculating the value of an adjustable parameter based on the physical characteristics of a speaker and setting the parameter to the value. Craven et al. discloses a coefficient calculator (reference 6) which calculates the coefficients (i.e. sets parameters) based on the physical natures of the loudspeaker where the speakers phase response can be compensated based on the calculated coefficients (Column 8, lines 1-19). Craven et al. teaches compensation of the speakers phase response eliminates distortions introduced by the speaker (Column 8, lines 11-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a step of calculating the value of a parameter based on the physical characteristics of the speaker in order to eliminate distortions introduced by the speaker and create a higher fidelity audio output.

Regarding Claim 49, Narasimhan et al. as modified discloses a method as described in claim 48 above. Narasimhan et al. further discloses the loudspeaker response (i.e. physical characteristics is modeled on the environment (i.e. radiating area) (Column 8, lines 1-7). It is also known in the art that physical characteristics of a speaker include at least one of: a cone and coil mass, air volume, mechanical

compliance, radiating area, damping, moving mass and motor characteristics. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust a parameter of a speaker having a physical characteristic to obtain a clearer audio signal.

Regarding Claim 53, Narasimhan et al. further discloses steps of: monitoring at least one program condition at the sonic reproduction device; and setting at least one of the parameters values based on the program condition (Narasimhan et al. discloses monitoring frequency tones (i.e. monitors program conditions) and using the values to adjust inverse filters (i.e. set at least one parameter)) (Column 1, lines 32-51).

Regarding Claim 54, it is known in the art that a speaker system will consist of a way to control volume setting. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a way of volume control with method as stated in Claim 53.

26. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan et al. as applied to claim 48, 50, and 51 above in view of Konno (US Patent 5,305,388). Narasimhan et al. discloses a method as stated in claims 48, 50 and 51 above. Narasimhan et al. does not disclose modulating the setting of at least one parameter in response to setting of another parameter. Konno discloses an audio compensation circuit with a filter that when the parameter of volume amplitude is changed, parameters Q and cutoff frequency are also adjusted resulting the filter being changed in a natural manner (Column 2, lines 23-29). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to include a parameter that can be set in response to another parameter in order to for filter to be changed in a natural manner and create a higher fidelity audio output.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tanaka et al. (US Patent 5,588,065). Tanaka et al discloses an audio reproduction device with a vibration detector on speaker unit and feedback circuit from detector to amplifier.

Kippel (US Patent 5,815,585). Kippel discloses an adaptive arrangement for correcting the transfer characteristics of speaker. Includes compensation methods for transducer motion.

Kippel (US Patent 5,438,625). Kippel discloses compensating for the nonlinear effects of a transducer by using model of transducer.

Kippel (US Patent 5,694,476). Kippel discloses an adaptive filter for correcting the transfer of a transducer to compensate for linear and/or nonlinear distortions.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (703)305-5598. The examiner can normally be reached on 8 Hours, 5 day/week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

JIM

XU MEI
PRIMARY EXAMINER